Information Regarding Environmental Concerns Related To The United States Navy's Extremely Low Frequency Communications System Transmitter Facility at Clam Lake, Wisconsin

The U.S. Navy is mindful of its responsibilities and obligations to comply with various environmental protection laws, regulations, and policies, as well as applicable judicial decisions, in the operation of its Project Extremely Low Frequency (ELF) facilities.

Among those laws and regulations are the National Environmental Policy Act (NEPA) and its implementing regulations (40 C.F.R. §§ 1500 – 1508), the National Historic Preservation Act and its implementing regulations (36 C.F.R. Part 800) and guidelines, the Archeological Resources Preservation Act and the uniform implementing regulations within the U.S. Forestry Service (36 C.F.R. Part 296) and the Department of Defense (32 C.F.R. Part 229), and the Endangered Species Act and its implementing regulations (50 C.F.R. Part 402 and 50 C.F.R. Part 17).

Additionally, the Navy adheres to the Department of Defense's (DOD) American Indian and Alaska Native Policy of October 20, 1998 in its decision-making process related to actions at the ELF sites that might affect Native American tribal rights and resources. This Policy defines "Protected Tribal Resources" as:

> 'Those natural resources and properties of traditional or customary religious or cultural importance, either on or off Indian lands, retained by, or reserved by or for, Indian tribes through treaties, statutes, judicial decisions, or executive orders, including tribal trust resources.'

In accordance with the pertinent treaties, the Lac Courte Orielles (LCO) have certain rights to tribal resources in the ceded territories of northern Wisconsin, including the right to hunt, fish, and gather within the Chequamegon National Forest in which a Navy ELF facility, the Navy Radio Transmitter Facility Clam Lake, is located. Although this facility is located on National Forest land, the Navy recognizes its obligation to protect these treaty rights. The Navy understands and appreciates this obligation to preserve ecological resources, and to minimize, to the extent practicable, impacts on the LCO's right to hunt, fish and gather in the National Forest, as well as its responsibility to consider archeological, cultural, and historical resources in connection with its actions.

The Navy is also aware that, even though the widely-accepted research published in the scientific literature has failed to establish a definitive link between adverse biological, ecological and physiological impacts from ELF exposure at the levels and frequency produced at the Navy's ELF facilities, members of the LCO are concerned that the Navy's ELF transmitter may in some way be harmful to the health of LCO tribal members and to the environment in the National Forest. The Navy is aware of this perception and is committed to providing the LCO with relevant information relating to

operation of the ELF site and associated safety measures, and to making available scientific literature relating to ELF to assist tribal members to better understand ELF and Project ELF.

The Navy's program to develop an ELF communications system, including the need for very long land-based antennas, began in the upper Midwest in 1968. As part of the debate surrounding enactment of the NEPA in 1969, special concerns were raised regarding the possibility of bio-electromagnetic effects caused by operation of ELF transmitters in the forest areas where its deployment was planned.

Between 1969 and 1993, the Navy sponsored laboratory and field studies on ELF environmental and biological effects. In February 1975 and January 1977, the Naval Medical Research and Development Command (NMRDC) published compilations of Navy sponsored biomedical and ecological studies performed by the Navy, various universities, and industry laboratories up until that time under the Sanguine / Seafarer Biological-Ecological Research Program. These studies ranged from the impacts on the central nervous system in squirrels and monkeys to the health of personnel working at the Wisconsin ELF Test Facility. Through 1977, the Navy funded approximately $7.4 million in BIO/ECO research. A copy of each NMRDC report was provided to the LCO during our meetings April 27, 2000.

Additionally, the Navy requested the National Academy of Sciences perform a study to assess the possibility that plants, people, and animals could be harmed by the electric and magnetic fields produced by the Navy's proposed ELF system. After reviewing all of the available research literature on the subject, the National Research Council (NRC) published a report in 1977, which concluded, "…the likelihood of serious adverse biologic effects of (the ELF system) is very small." In rendering this conclusion, however, the NRC recommended that if the Navy decided to proceed with construction of the system, it should undertake a research program in the transmitter area(s) to determine if any subtle and unexpected biological harm might result from long-term operations. This recommendation was in line with the Navy's plans already in place for ecological monitoring.

When the ELF antenna construction was finally approved, the Navy took two actions to address biological and ecological concerns, including:

(1) establishing an unprecedented large scale ecological monitoring program in the Wisconsin and Michigan antenna areas, and,

(2) requesting the American Institute of Biological Sciences (AIBS) to provide an evaluation and analysis of the extant professional literature published since January 1977 about biological and human health effects of extremely low frequency non-ionizing radiation germane to the ELF system.

The AIBS published their findings in a March 1985 report entitled, Biological and Human Health Effects of Extremely Low Frequency Electromagnetic Fields (Post-1977 Literature Review). The AIBS report cites numerous research reports, books, project reports, articles, and papers from peer-reviewed journals that were reviewed by the AIBS committee.

With respect to the Navy's ELF system, the report concluded, "It is unlikely that exposure of living systems to ELF electric and magnetic fields in the range of those associated with the Navy's ELF Communications System can lead to adverse public health effects or to adverse effects on plants and animals." The committee also recommended, "Because of certain ambiguities in the scientific literature, the Navy should continue to monitor the literature and respond appropriately to any significant new information."

The Navy's Ecological Monitoring Program began in 1982 and encompassed eleven individual studies searching for possible ELF effects on wetlands, slime mold, Wisconsin birds, Michigan birds,

small vertebrates, litter decomposition and micro-flora, upland flora, aquatic ecosystems, pollinating insects, soil arthropods and earthworms, and soil amoebae.

After ten years of study by scientists from five universities in the Great Lakes area at a cost of approximately $25 million, the ecological monitoring field data collection ended in 1993. Investigators were required to submit yearly reports of their activities and findings. After the conclusion of field data collection activities in 1993, each investigator prepared a comprehensive final report of their findings with the last report being completed in 1996. Annual symposia were also held to allow interchange among program investigators, engineers and managers involved with development of ELF system, and the general public.

None of the researchers reported any significant adverse biological effects on the studied organisms that could be attributed to operation of the ELF system in their final reports. All of the research reports were published and widely distributed, and all are presently available from the National Technical Information Service (NTIS) (http://www.ntis.gov) or National Academy Press (http://www.nap.edu). A copy of the final report for each Ecological Monitoring Program study was provided to the LCO during our meetings on April 27, 2000. In addition to program reports, the Navy encouraged each researcher to publish his/her work in the open scientific literature. To date, some 270 scientific presentations and published papers have resulted from the Navy's ELF Ecological Monitoring Program.

Upon completion of the ELF Ecological Monitoring Program studies, the Navy returned to the National Academy of Sciences and submitted the research for review by the NRC. The NRC's findings were released July 1, 1997 in a report entitled, An Evaluation of the U.S. Navy's Extremely Low Frequency Communications System Ecological Monitoring Program.

In its report, the NRC concluded "The committee agrees with the general findings of the Navy's ecological monitoring program, within the limitations described in this report, that the researchers' observations provide no evidence of statistically significant, widespread, adverse effects of EMF's associated with the ELF antennas." Along with discussions of the limitations relating to its conclusion, the NRC committee specifically recommended that the monitoring studies not be repeated. The committee did suggest, however, that in order to address "small effects" (i.e., effects whose magnitudes are not likely to exceed those expected from normal seasonal and climatic changes, over the short term), consideration be given to reanalysis of exposure-assessment data for several of the studies, and that controlled laboratory studies be carried out in a few instances.

In its suggestion to reassess exposure information and reanalyze data in these studies, the NRC committee expressed a desire to more closely examine possible effects that are smaller than those which might be expected from normal seasonal and climatic changes. The Navy believes that the researchers used exposure data appropriately and that, if small effects are present, but were not noticed during careful monitoring over several years of ELF operation, these effects are not likely to be apparent during a data reanalysis. Accordingly, the Navy decided not to pursue this matter further.

The Navy believes that the NRC's general conclusion relating to a lack of evidence of statistically significant, widespread, adverse effects of electric and magnetic fields (EMF) associated with ELF antennas provides reasonable support for the continued long-term operation of the ELF Communications System, based upon the absence of demonstrable environmental effects. The Navy nevertheless supports appropriate additional bio-electromagnetic research activities, but does not presently plan to undertake the funding of such research.

The United States Congress has also supported and funded analyses and research to assess possible health effects from exposure to power line frequency electric and magnetic fields.

In 1991, the U.S. Congress asked the National Academy of Sciences to review the research literature on the effects of exposure to electric and magnetic fields produced by electric power lines and the use of electric appliances. The NAS formed a panel that was tasked to perform this review and determine whether the scientific basis was sufficient to assess health risks from such exposures. In 1997, the NRC published a report entitled Possible Health Effects of Exposure to Residential Electric and Magnetic Fields. In this report the panel concluded, "Based on a comprehensive evaluation of published studies relating to the effects of power-frequency electric and magnetic fields on cells, tissue, and organisms (including humans), the conclusion of the committee is that the current body of evidence does not show that exposure to these fields presents a human-health hazard."

In 1992, under the Energy Policy Act (Public Law 102-486 Section 2118), the U.S. Congress instructed the Secretary of Energy to establish the Electric and Magnetic Fields Research and Public Information Dissemination (EMF-RAPID) Program to:

(1) determine whether or not exposure to electric and magnetic fields produced by the generation, transmission, and use of electric energy affects human health;

(2) carry out research, development, and demonstration with respect to technologies to mitigate any adverse human health effects; and,

(3) provide for dissemination of information to the public. The National Institute of Environmental Health Sciences (NIEHS) and the Department of Energy (DOE) managed the health effects research and evaluation part of this program.

EMF-RAPID was a 5-year effort jointly funded by Federal and matching private funds, with NIEHS receiving $30.1 million. In June 1999, the NIEHS published a report in response to the 1992 Energy Policy Act, 'Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields' (NIEHS Pub No. 99-4493). In this report it states, "The NIEHS believes that the probability that ELF-EMF exposure is truly a health hazard is currently small." Further, the NIEHS believes only, "…passive regulatory action is warranted such as a continued emphasis on educating both the public and regulated community on means aimed at reducing exposures."

Significant research efforts relating to the potential for health effects from power-line and ELF system frequency electromagnetic fields has been performed by various individuals and entities worldwide for more than 30 years. The net result of all of this research has failed to demonstrate that ELF electric and magnetic fields at the levels associated with operation of the ELF Transmitter, both power-line and modulated, cause any significant adverse environmental or biological impacts.

The Navy continues to monitor the relevant scientific research throughout the world relating to reported effects of ELF electric and magnetic fields and reports its findings. Currently, the Navy has Information Ventures Inc. (IVI) under contract to provide the Navy with documentation and critical review of current research on the biological effects and health implications of extremely low frequency non-ionizing electromagnetic radiation. IVI produces a quarterly report, BENER / ELF, which is readily available from IVI. The Navy also encourages the scientific community to continue studying ELF / EMF effects.

Given the failure of the extensive scientific research published to date to demonstrate biological and ecological effects from ELF EMF, the Navy believes that the additional studies

proposed by the LCO, which are similar to those all ready completed, can be expected to produce similar results.

In summary, the Navy funded laboratory studies in the 1970's to complement basic laboratory research undertaken by DOE, EPRI, NIEHS, EPA, NCI, etc. to determine possible mechanisms and exposure relationships of extremely low frequency electromagnetic effects on ecology and human health.

A comprehensive NRC review of all published work in the field concluded, in 1977, that no harmful effects from ELF system operations should be expected. Subsequently, and partly based on an NRC recommendation, the Navy instituted an in situ ecological monitoring program to determine if any unexpected effects would occur from operation of the ELF system. That program was completed and no consistent or adverse effects exceeding normal yearly variations were observed. Since more than 30 years of research have failed to produce scientifically accepted results of adverse EM effects, at the relevant EM field intensities, or that the operation of the Navy's ELF system is harmful to the ecology, the Navy does not plan to sponsor additional laboratory or field research in this area. The Navy will, however, continue to monitor the bio-electromagnetic effects literature to insure that all new research findings are considered as part of the Navy's commitment to safe operation of the ELF system and we will provide you with any relevant information.

Regarding each of the specific proposals contained in the LCO's Mitigation Plan, the Navy's positions are as follows:

1. Establish a Memorandum of Understanding (MOU) with the Navy to facilitate consultation between the Tribe and DOD.

Navy's Position: The Navy supports the creation of an MOU between the LCO and the Navy on a government-to-government basis to provide a framework for communications and the exchange of information.

2. Determine the impacts of induced or stray currents on the Chequamegon National Forest and assess possible health impacts from Project ELF's modulation pattern.

Navy's Position: Based upon available scientific information and approximately 30 years of operation of the initial ELF site, the Navy does not believe further study is warranted. The Navy has an ongoing program that monitors the operation of the ELF site for both safety and nuisance incidents. Reported incidents or complaints are investigated and appropriate mitigation actions are taken as needed. The Navy's "fence mitigation" program is an example of these ongoing actions undertaken to reduce or remove potential impacts from the ELF site.

3. Carry out studies to include vegetation surveys and laboratory experiments to assess the impacts of Project ELF on native plants used traditionally by Ojibwe People.

Navy's Position: Based upon the available widely accepted scientific research, the Navy believes that no further research is warranted.

4. Complete studies of the impact of the electromagnetic fields of Project ELF on the resident fish population.

Navy's Position: Based upon the available widely accepted scientific research, the Navy believes that no further research is warranted.

5. Characterize the wetlands of the Chequamegon National Forest, complete studies of vegetation that exists, and assess impacts on amphibians.

Navy's Position: Based upon the available widely accepted scientific research, the Navy believes that no further research is warranted.

6. Complete laboratory studies to determine if the electromagnetic fields of Project ELF could potentially accelerate growth of cancerous human breast cells.

Navy's Position: Based upon the NEIHS Report, Publication No.99-4493, May 1999, and other available widely accepted scientific research, the Navy believes that this research is not warranted.

7. Work with the U.S. Forestry Service and consultants to complete a cultural resources survey and cultural impact analysis of lands within the Chequamegon National Forest used by Project ELF.

Navy's Position: The Navy will comply with applicable laws, regulations, and policies regarding the requirement to conduct cultural and archeological resource surveys and inventories related to federal actions associated with the Navy's ELF sites, and will cooperate with the U.S. Forest Service should it elect to fund and complete a cultural resources survey of the Chequamegon National Forest. The Navy is committed to preserving, to the extent practicable, cultural and archeological resources that might be situated within the ELF facilities. Appropriate cultural resource surveys shall be completed in conjunction with the NEPA process for all new proposed federal actions on the ELF sites before a decision is made on the proposed action. The Navy has already commenced meeting this obligation in conjunction with proposed improvements to the Clam Lake ELF site by contracting with the U.S. Forest Service to complete the required archeological and cultural resource surveys in connection with the Environmental Assessment (EA) that will be prepared for this proposed action. The Navy will continue to accomplish such studies in any future improvements to the facilities.

8. Working in consultation with the Wisconsin Division of Public Health, establish cancer protocols and carry out interviews of all cancer patients to determine possible environmental causes.

Navy's Position: Based upon the available widely accepted scientific research, the Navy believes that this action is not warranted if sought to be justified based upon the operation of the Navy's ELF facilities.

9. Implement a prudent avoidance program for tribal hunters and gatherers to make them aware of the potential risks of long-term exposure to electromagnetic fields of Project ELF.

Navy's Position: The Navy supports and will participate in an informational effort to educate LCO members as to the operation of the ELF facilities and potential safety issues associated with tribe members exercising tribal rights within the Navy's ELF site in the National Forest. The Navy will work with the LCO to develop and implement a public information outreach program. This program will be primarily for the LCO, but will also extend to the general public, as deemed advisable. The outreach effort will provide information to interested individuals on the ELF Transmitter and its

operation. The Navy will also provide guidance on activity “do’s and don’ts” in the ELF rights of way. Also included in this program will be information, as it becomes available, on proposed modifications to the facility as well as the schedule of these modifications.

10. Proposed study to determine possible effects of Project ELF’s 76 Hz electromagnetic fields on the operant behavior of adult rats.

Navy’s Position: Based upon the available widely accepted scientific research, the Navy believes that this research is not warranted.

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